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29.11.1997 KR 9764512

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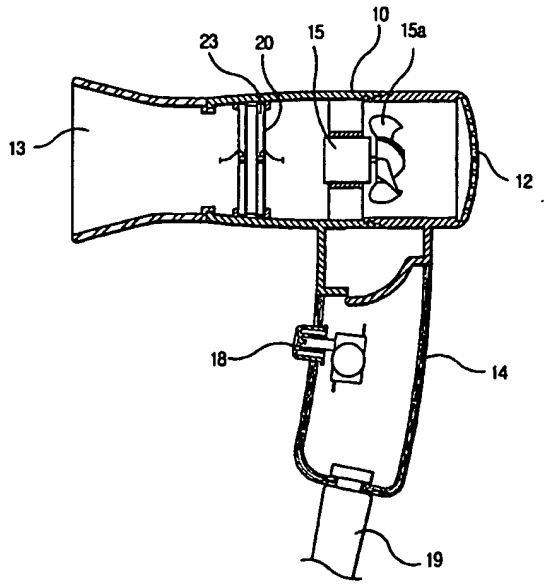
(54) Hair dryer

(57) A hair dryer having a heater is disclosed. The heater is made of ceramic material such as silicon carbide (SiC), lanthanum chromate ($LaCrO_3$), our zirconium dioxide (ZrO_2).

FIG. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 1736

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 316 077 A (CARLSON RICHARD H) 16 February 1982 (1982-02-16) * column 3, line 48 - column 4, line 51; figures 1-3,7,8 *	1-5,8-12	A45D20/08 H05B3/14
A Y		6,13,14 7,15	
X	US 3 927 300 A (WADA SHIGETAKA ET AL) 16 December 1975 (1975-12-16) * column 2, line 16-20 *	1,6-8,13	
Y	* column 8, line 45-47; figures 1-4,6 * * column 8, line 12-21 *	14	
Y	US 5 039 843 A (MUELLER MANFRED K) 13 August 1991 (1991-08-13) * abstract; figure 5 *	7,15	
Y	US 5 023 744 A (HOFSAESS PETER) 11 June 1991 (1991-06-11) * abstract *	7,15	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	30 November 2000	Lang, D

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 30 1736

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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30-11-2000

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(54) Hair dryer

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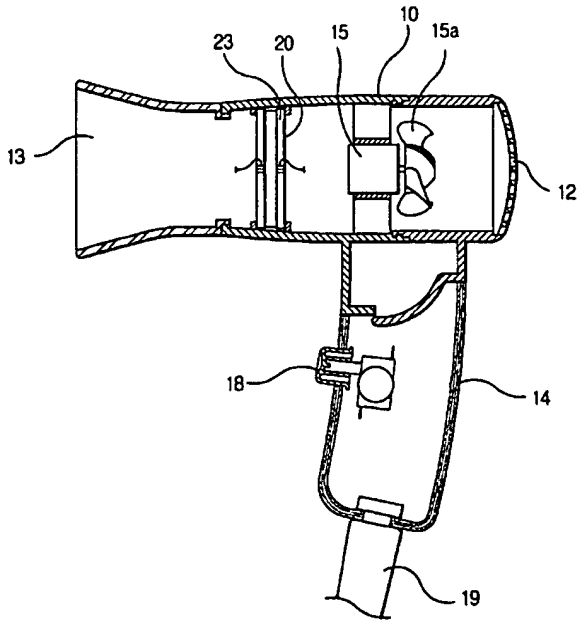
FIG. 2



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Description

[0001] The present invention relates to a hair dryer comprising a heater.

[0002] A conventional hair dryer is illustrated in Figure 1 and includes a body 1 containing a motor 5 for driving a fan 5a and a coil type heater 6 which is wound on a bracket 7. Air inlet ports 2 and a discharge port 3 are provided in the body to allow the flow of air therethrough.

[0003] A handle 4 extends from the body 1 on which a switch 8 for controlling the operation of the hair dryer is mounted and a lead through which electrical current may be supplied to the hair dryer extends from a lower end of the handle. A plug (not shown) is attached to the free end of the lead 9 for insertion into an electrical supply socket.

[0004] When the hair dryer is in use, the heater 6 radiates heat and the fan, driven by the motor 5, draws air into the body 1 through the inflow ports 2 toward the heater 6. The air blown toward the heater 6 is thereby heated and discharged through the discharge ports 3.

[0005] A problem with a conventional hair dryer of the type discussed above, is that the heater 6 and the bracket 7 on which the heater is wound, are manufactured separately. Furthermore, the process of winding the heater 6 onto the bracket 7 must be done manually. This results in a complex manufacturing process and increased costs.

[0006] In addition to the aforementioned disadvantages, the bracket 7 must be quite large to accommodate the heater 6 which must be wound around the bracket many times to ensure its efficiency. This results in an increase in the overall size and weight of the hair dryer.

[0007] Furthermore, it is difficult to accurately and finely control the temperature of the heated air using a conventional heater, which can result in hair damage caused by overheating. Also, the wire forming the coil of the heater 6 may eventually break after continuous use due to the repetition of supply and interruption of electrical power.

[0008] Finally, it takes a considerable length of time for the heater of a conventional hair dryer to reach the required operating temperature resulting in an increase in consumption of electrical power whilst the hair dryer is not being used.

[0009] It is an object of the present invention to overcome or substantially alleviate the disadvantages referred to above.

[0010] A hair dryer according to the present invention is characterised in that the heater is formed from a ceramic material.

[0011] Preferably, the ceramic material is silicon carbide (SiC), lanthanum chromate ($LaCrO_3$) or zirconium dioxide (ZrO_2).

[0012] In one embodiment, the ceramic material may contain metal powder.

[0013] In a preferred embodiment, the hair dryer includes a body and an insulating member disposed between the heater and the body.

[0014] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is side sectional view of a conventional hair dryer;

Figure 2 is a side sectional view of a hair dryer according to a first embodiment of the present invention;

Figure 3 is a perspective view of the heater shown in Figure 2;

Figure 4 is a block diagram of the hair dryer according to an embodiment of the present invention;

Figure 5 is a side sectional view of a hair dryer according to another embodiment of the present invention;

Figure 6 is a perspective view of the heater shown in Figure 5;

Figure 7 is a perspective view of a hair dryer according to yet another embodiment of the present invention.

[0015] The hair dryer according to the present invention has a body 10, a motor 15, a fan 15a, a grip 14, a switch 18, and a cord 19, as does a conventional hair dryer of the type illustrated in Figure 1.

[0016] A heater 20 made from a heat-radiating ceramic material such as silicon carbide (SiC), lanthanum chromate ($LaCrO_3$), or zirconium dioxide (ZrO_2) is mounted within the body 10. The heater 20 may also be manufactured with a compound material comprising a ceramic material and metal powder.

[0017] The heater 20 is disc shaped to conform with the shape of the body 10, and has a webbed construction. The heater 20 is disposed so that air blown by the fan 15a is discharged through the discharge port 13 via the heater 20.

[0018] The heater 20 is surrounded by a member 23 which has a pair of connection terminals 26, each having a pair of holes 25a and 25b. The hole 25a formed in the outer edge of the connection terminal 26 is used to fix the connection member 23 to the body 10 by means of screw, and the hole 25b formed in the inner edge of the connection terminal 26 is used to connect the connection terminal to the electrical cord 19.

[0019] A block diagram of the hair dryer is illustrated in Figure 4. The hair dryer has a control portion 30 for controlling the supply of electrical power from a power supply portion 29, a heat-radiating portion 40 for radiating heat, and a blowing portion 50 for blowing air toward the heater 20.

[0020] The control portion 30 comprises a filter 31 for reducing electrical noise, a fuse 33 for preventing the hair dryer form overloading and a user operated switch 18 for controlling the supply of electric power to the heater 20 and the motor 15.

[0021] The heat-radiating portion comprises a bimetal

switch 41 and the heater 20. The heater 20 radiates heat when the switch 19 is turned on, and the bimetal switch 41 prevents the heater 20 from overheating by disconnecting the supply of electrical power to the heater 20.

[0022] The blowing portion 50 comprises a voltage divider 51, a rectifier 53, and a motor 15. The electrical power supplied from the power supply portion 29 is stepped down to an appropriate voltage and is then rectified into a direct current. The voltage rectified from the rectifier 53 is applied to the motor 15, to drive fan 15a.

[0023] When the switch 18 is operated the heater 20 radiates heat and the fan 15a operates to into the body 10 through the inflow ports 12 and blow it toward the heater 20. The heater 20 heats the air before it is discharged through the discharge port 13.

[0024] A second embodiment is illustrated in Figures 5 and 6. In this embodiment a pair of ribs 61 are provided within the body between which the connection member 23a fits.

[0025] A ring-shaped insulation member 60 is disposed between the ribs and insulates the heater 20 from the body 20 so that the heat generated from the heater 20 is not transferred to the body 20 through the connection member 23a which could otherwise cause deformation of the body 20. The insulation member 60 is made of mica.

[0026] In a third embodiment illustrated in Figure 7, the heater 20 is disc shaped rather than having a webbed construction. It is formed with a plurality of holes 21 through which air blown by the fan 15a passes as it travels towards the discharge port 13. The heater 20 of this embodiment is easier to manufacture than previously described embodiments.

[0027] A heater 20 is made of a heat-radiating ceramic material, it is no longer necessary to wind a coil of wire around on a bracket and so the manufacturing process is simplified. In addition, the ceramic heater is small and light in comparison with a coil type heater, so the weight and size of the hair dryer can be reduced.

[0028] Furthermore, the heater 20 can maintain continuous heat intensity, and overheating is prevented by the bimetal switch 41.

[0029] Moreover, as there is no coil, malfunctions are reduced. Additionally, the ceramic heater 20 heats up much faster than conventional heaters.

[0030] Although the present invention has been described and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, wherein the scope of the present invention is limited only by the terms of the appended claims.

Claims

1. A hair dryer comprising a heater (20), characterised in that the heater (20) is formed from a ceramic material.

2. A hair dryer according to claim 1, wherein the ceramic material is silicon carbide (SiC), lanthanum chromate ($LaCrO_3$) or zirconium dioxide (ZrO_2).

3. A hair dryer according to claim 1 or 2, wherein the ceramic material contains metal powder.

4. A hair dryer according to any preceding claim, wherein the heater (20) has a webbed construction.

5. A hair dryer according to any of claims 1 to 3, wherein the heater (20) has a plurality of holes extending through it.

6. A hair dryer according to any preceding claim, comprising a body (10) and an insulating member disposed between the heater (20) and the body (10).

7. A hair dryer according to any preceding claim, comprising a bimetallic switch (41) for terminating power to the heater (20) when a predetermined temperature has been reached.

8. A hair dryer comprising:

   a body being formed with an inflow port and a discharge port;
   a heater made of a heat-radiating ceramic material;
   a connection member being installed on a side of said heater, said connection member for connecting said heater with an external power source; and
   a fan for blowing air flowing into said body through the inflow port and for discharging air heated by said heater through the discharge port.

9. The hair dryer as claimed in claim 8, wherein said ceramic material is selected from a group consisting of silicon carbide (SiC), lanthanum chromate ($LaCrO_3$), and zirconium dioxide (ZrO_2).

10. The hair dryer as claimed in claim 9, wherein metal powder is combined with said ceramic material.

11. The hair dryer as claimed in claim 8, wherein said heater is formed into a web shape.

12. The hair dryer as claimed in claim 8, wherein said heater is formed with a plurality of holes.

13. The hair dryer as claimed in claim 8, wherein said connection member is fixed at an inner side of said body, and an insulation member is disposed between said connection member and said body.

14. The hair dryer as claimed in claim 13, wherein said

insulation material is mica.

15. The hair dryer as claimed in claim 8, further comprising a bimetal switch for interrupting a supply of electrical power to said heater when a temperature of said heater rises higher than a predetermined temperature.

FIG. 1

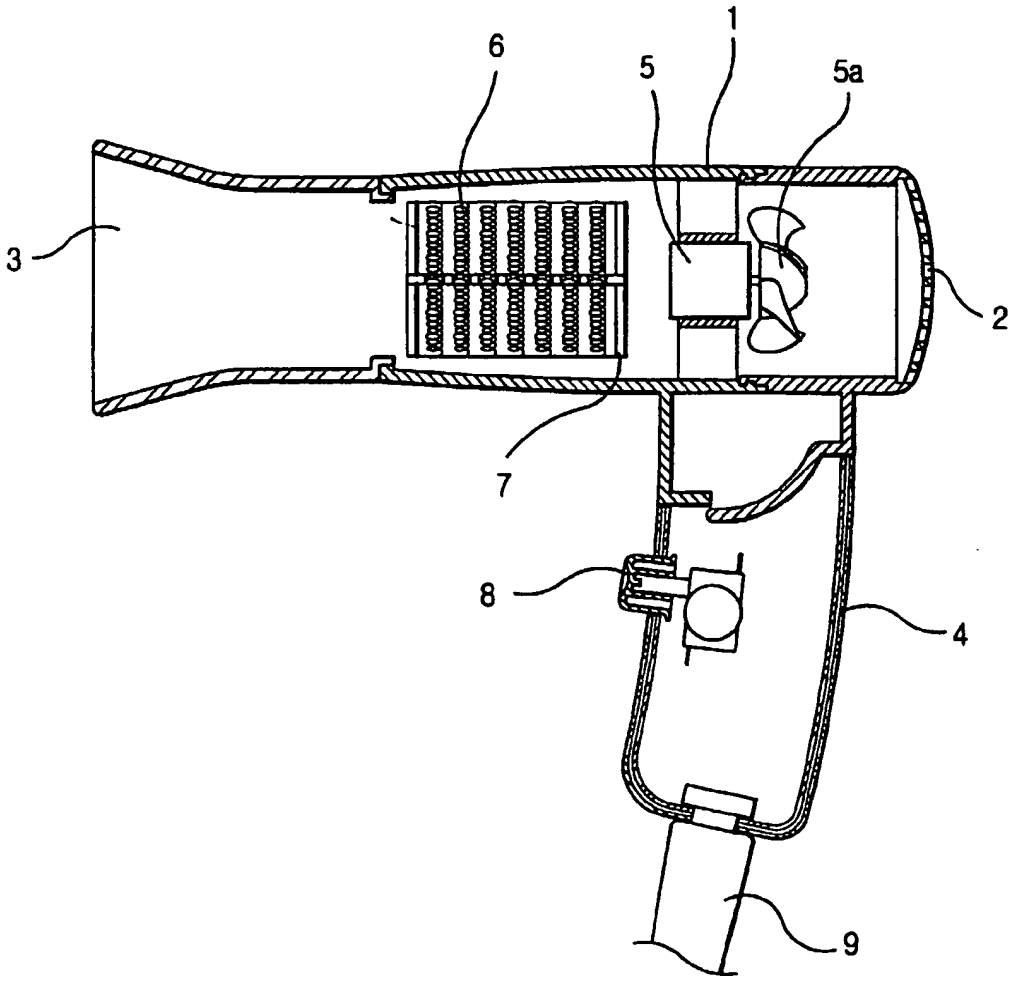


FIG. 2

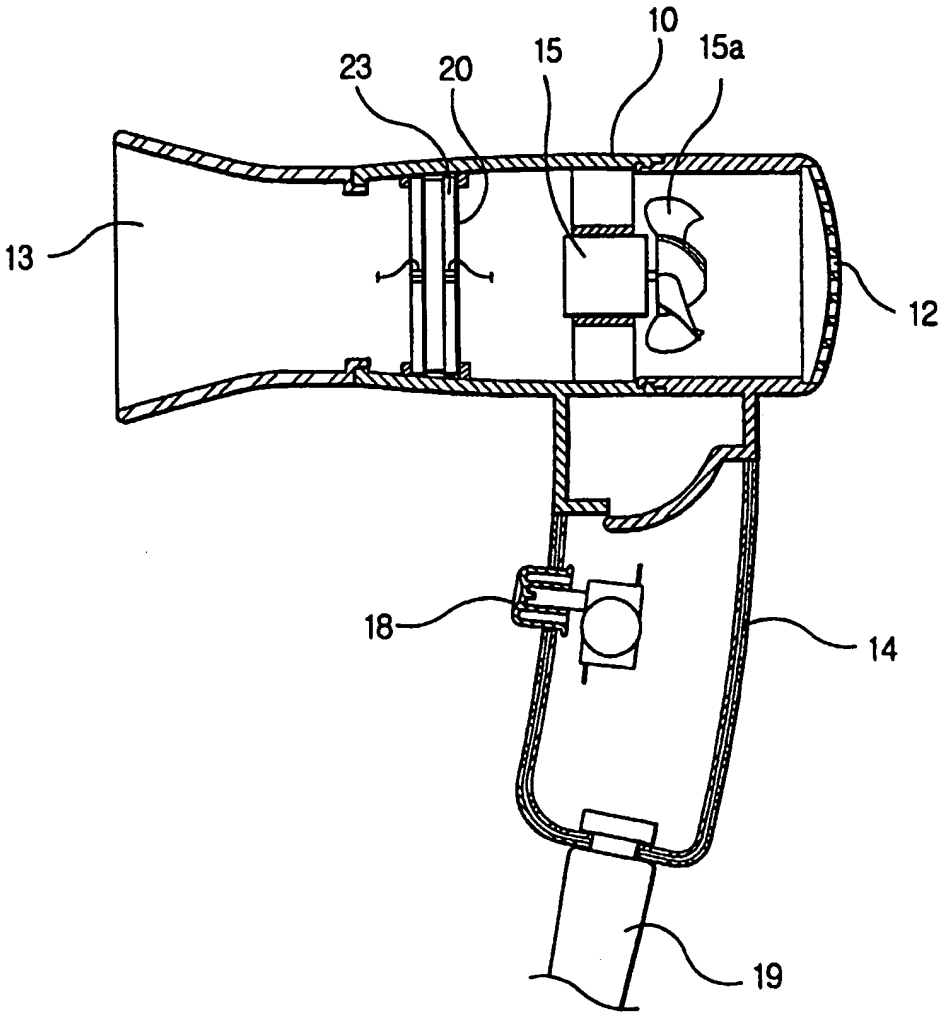
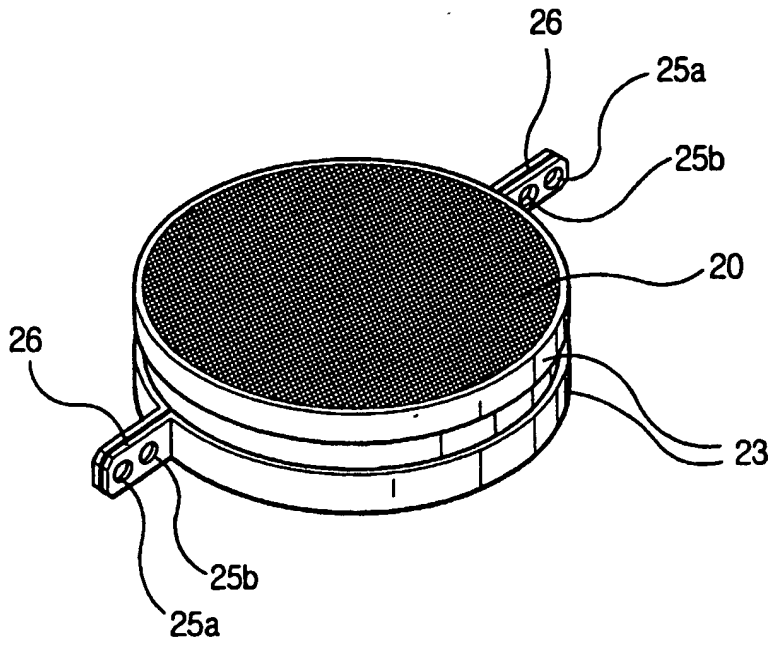


FIG. 3



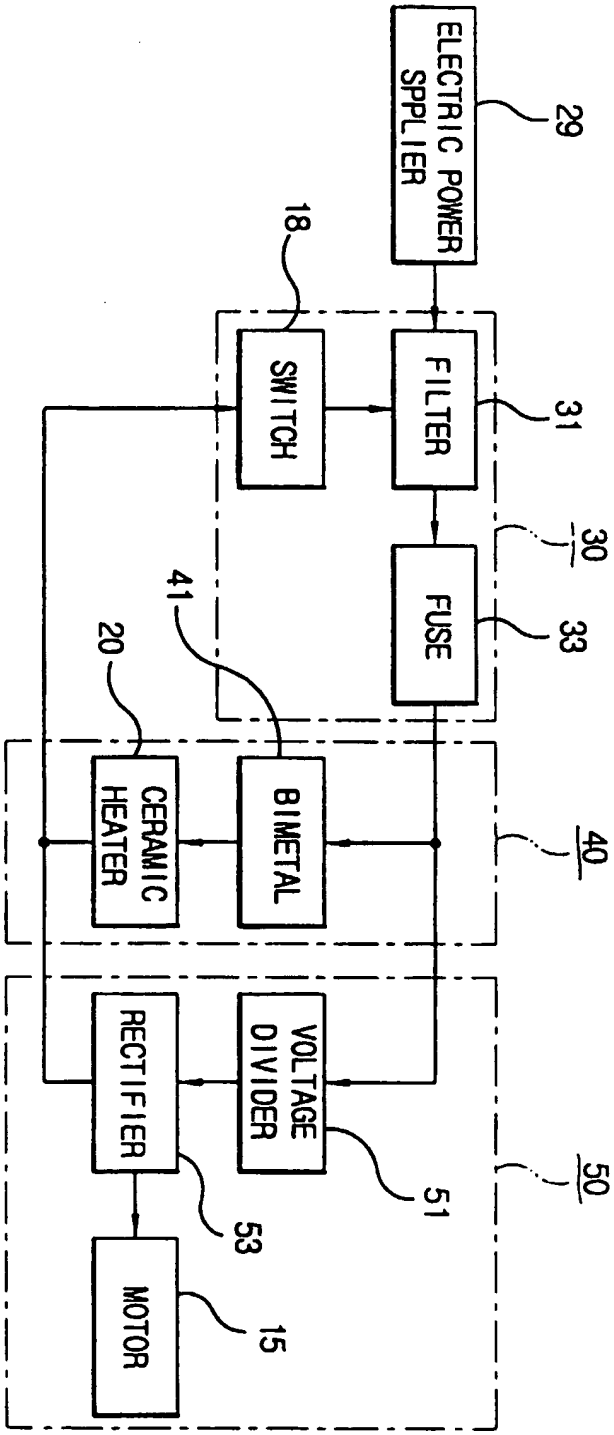

ELECTRIC POWER SPPLIER
29
18
SWITCH
FILTER
31
30
FUSE
33
41
20
CERAMIC HEATER
BIMETAL
40
RECTIFIER
VOLTAGE DIVIDER
51
50
53
MOTOR
15

FIG. 4

FIG. 5

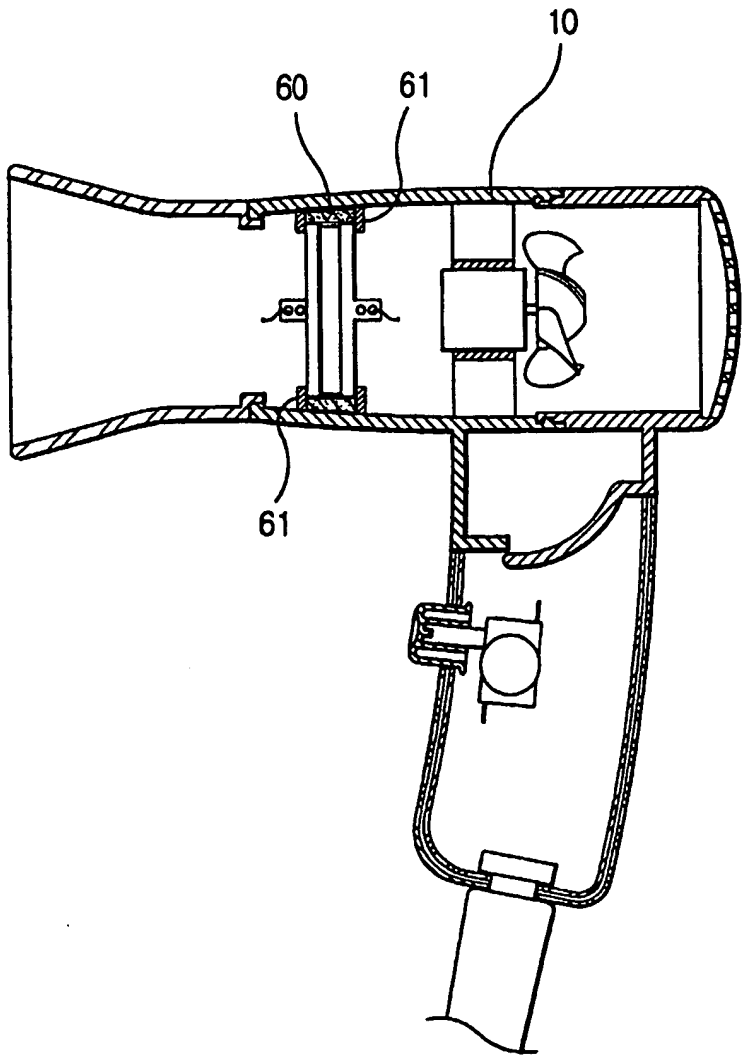


FIG. 6

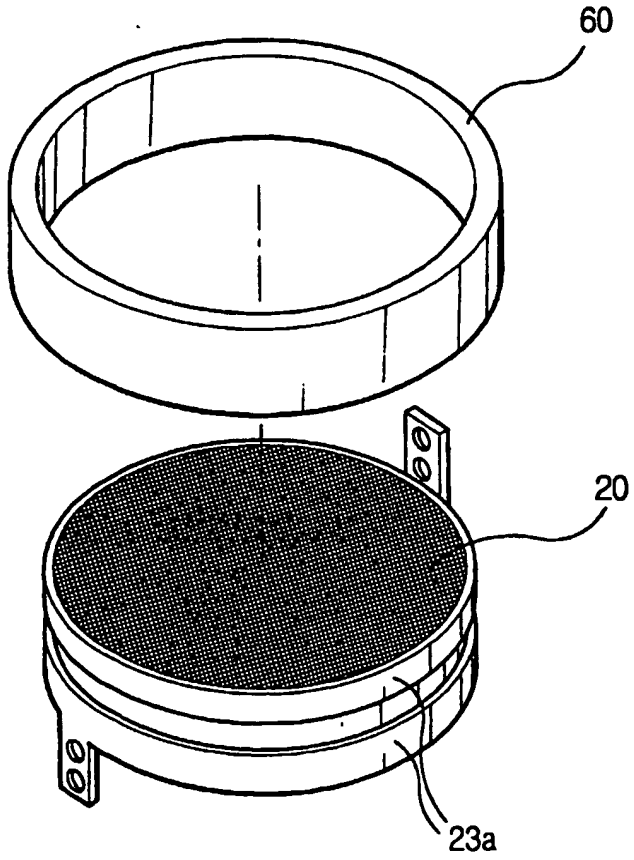


FIG. 7